



SEQUENCE LISTING

<110> KUMAGAI, Monto H.  
DELLA-CIOPPA, Guy R.  
ERWIN, Robert L.  
McGEE, David R.

<120> METHOD OF DETERMINING THE PRESENCE OF A  
TRAIT IN A PLANT BY TRANSFECTING A NUCLEIC ACID SEQUENCE OF  
A NON-PLANT DONOR INTO A HOST PLANT IN A POSITIVE  
ORIENTATION

<130> 008010137US07

<140> 09/359,300

<141> 1999-07-21

<150> 60

<170> FastSEQ for Windows Version 3.0

<210> 1

<211> 26

<212> DNA

<213> Tomato mosaic virus

<400> 1

ctcgcaaagt ttgaaccaa atcctc

26

<210> 2

<211> 35

<212> DNA

<213> Tomato mosaic virus

<400> 2

cggggtacct gggccccaac cggggggttcc ggggg

35

<210> 3

<211> 41

<212> DNA

<213> Tomato mosaic virus

<400> 3

tctcgagcc taggetcgca aagtttcgaa ccaaatactc a

41

<210> 4

<211> 35

<212> DNA

<213> Tomato mosaic virus

<400> 4

cggggtacct gggccccaac cggggggttcc ggggg

35

<210> 5

<211> 24

<212> DNA

<213> Tomato mosaic virus  
 <400> 5  
 tatgtatggt gcagaagaac agat 24  
 <210> 6  
 <211> 24  
 <212> DNA  
 <213> Tomato mosaic virus  
 <400> 6  
 agtcgactct tctctctctg gcac 24  
 <210> 7  
 <211> 30  
 <212> DNA  
 <213> Tomato mosaic virus  
 <400> 7  
 tgctcgagtg tgttcttcag tttctgtca 30  
 <210> 8  
 <211> 30  
 <212> DNA  
 <213> Tomato mosaic virus  
 <400> 8  
 aactcgagcg ctctgatttc tccgaagctt 30  
 <210> 9  
 <211> 114  
 <212> DNA  
 <213> Tomato mosaic virus  
 <220>  
 <221> CDS  
 <222> (28)...(115)  
 <400> 9  
 gtttttaaata cgtcgaggt tttaaatt atg tct gtt gcc ttg tta tgg gtt gtt 54  
 Met Ser Val Ala Leu Leu Trp Val Val  
 1 5  
 tct cct tgt gac gtc tca aat ggg aca agt ttc atg gaa tca gtc cgg 102  
 Ser Pro Cys Asp Val Ser Asn Gly Thr Ser Phe Met Glu Ser Val Arg  
 10 15 20 25  
 gag gga aac cgt 114  
 Glu Gly Asn Arg  
 <210> 10  
 <211> 29  
 <212> PEST  
 <213> Tomato mosaic virus

<400> 10  
 Met Ser Val Ala Leu Leu Trp Val Val Ser Pro Cys Asp Val Ser Asn  
 1 5 10 15  
 Gly Thr Ser Phe Met Glu Ser Val Arg Glu Gly Asn Arg  
 20 25

<210> 11  
 <211> 39  
 <212> DNA  
 <213> Nicotiana benthamiana

<400> 11  
 gcctcgagtg cagcatggaa acccttctaa agcttttcc 39

<210> 12  
 <211> 36  
 <212> DNA  
 <213> Nicotiana benthamiana

<400> 12  
 tccctaggtc aaaggctctc tattgctaga ttgcc 36

<210> 13  
 <211> 111  
 <212> DNA  
 <213> Tobacco mosaic virus

<220>  
 <221> CDS  
 <222> (25)...(111)

<400> 13  
 gttttaata cgctcgagtg cagc atg gaa acc ctt cta aag cct ttt cca 51  
 Met Glu Thr Leu Leu Lys Pro Phe Pro  
 1 5

tct cct tta ctt tcc att cct act cct aac atg tat agt ttc aaa cac 99  
 Ser Pro Leu Leu Ser Ile Pro Thr Pro Asn Met Tyr Ser Phe Lys His  
 10 15 20 25

aac ttc act ttt 111  
 Asn Phe Thr Phe

<210> 14  
 <211> 29  
 <212> PRT  
 <213> Tobacco mosaic virus

<400> 14  
 Met Glu Thr Leu Leu Lys Pro Phe Pro Ser Pro Leu Leu Ser Ile Pro  
 1 5 10 15  
 Thr Pro Asn Met Tyr Ser Phe Lys His Asn Phe Thr Phe  
 20 25

<210> 15

<211> 44  
 <212> DNA  
 <213> Erwinia herbicola  
  
 <400> 15  
 ccaagcttct cgagtgcagc atgcagcaac cgccgctgct tgac 44  
  
 <210> 16  
 <211> 43  
 <212> DNA  
 <213> Erwinia herbicola  
  
 <400> 16  
 aagatctctc gagstaaacg ggacgctgcc aaagaccggc cgc 43  
  
 <210> 17  
 <211> 23  
 <212> DNA  
 <213> Tobacco mild green mosaic virus  
  
 <400> 17  
 tgtgaaactc gaaaaggctc cgg 23  
  
 <210> 18  
 <211> 36  
 <212> DNA  
 <213> Tobacco mild green mosaic virus  
  
 <400> 18  
 cgggggtacct gggccgctac cggcgggttag gggagg 36  
  
 <210> 19  
 <211> 31  
 <212> DNA  
 <213> Ribgrass mosaic virus  
  
 <400> 19  
 tactcgaggt tcataagacc gcggtaggcg g 31  
  
 <210> 20  
 <211> 36  
 <212> DNA  
 <213> Ribgrass mosaic virus  
  
 <400> 20  
 cgggggtacct gggccctac ccgggggttta gggagg 36  
  
 <210> 21  
 <211> 107  
 <212> DNA  
 <213> N. tabacum  
  
 <220>  
 <221> CDS  
 <222> 21.....107  
  
 <400> 21

gttttaaata cgctcgagcc atg gct tcc tca gtt ctt tcc tct gca gca gtt 53  
Met Ala Ser Ser Val Leu Ser Ser Ala Ala Val  
1 5 10

gcc acc cgc agc aat gtt gct caa gct aac atg gtt gca cct ttc act 101  
Ala Thr Arg Ser Asn Val Ala Gln Ala Asn Met Val Ala Pro Phe Thr  
15 20 25

ggc ctt 107  
Gly Leu

<210> 22  
<211> 29  
<212> PRT  
<213> N. tabacum

<400> 22  
Met Ala Ser Ser Val Leu Ser Ser Ala Ala Val Ala Thr Arg Ser Asn  
1 5 10 15  
Val Ala Gln Ala Asn Met Val Ala Pro Phe Thr Gly Leu  
20 25

<210> 23  
<211> 1543  
<212> DNA  
<213> Tobacco mild green mosaic virus

<400> 23  
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ttgtcagata aaagggttggt taaagatttg ttttttggtt gaactgagtcg ataattgtctt 120  
acgagccctaa agttagtgc ttccttgctc ttacgaaaaa ggaggaaaatt ttacccaagg 180  
ctttgacgag attaaagact gtctctatta gtactaagga tgttatatct gttaaggagt 240  
ctgagtcctt gtgtgatatt gatttggttag tgaatgtgcc attagataag tataggatatg 300  
tgggtgtttt ggggtgttggt ttccacgggtg aatgggtggt accggatttc gttaaagggtg 360  
gggtaacagt gaggctgatt gacaaaacggc ttgaaaattc cagagagtgc ataattggta 420  
cgtaccgagc tggctgtaaag gacagaaggt tccagttcaa gctgggttcca aattacttcg 480  
tatccattgc ggatgcacaag cgaaaaacgt ggcaggttca tgtgogaatt caaaattctga 540  
agatccgaagc tggatggcaa cctctagctc tagaggtggt tctgtttgct atggttacta 600  
ataacgttgt tgttaaagggt ttgagggaaa aggtcatcgc agtgaatgat ccgaaactcg 660  
aagggtttcg aaggtgtggtt gacgatttcg tcgatttcgt tggctgcattc aaggcgattg 720  
acagttttcg aaagaaaaag aaaaagattg gaggaaggga tgtaaaatat aataagtata 780  
gatatagacc ggagagatac gcgggtcctg attcgttaca atataaagaa gaaaatgggtt 840  
tacaacatca cgagctcgaa tcagtaccag tatttcgcag cgatgtgggc agagccaca 900  
gcgatgctta accagtgggt gtctgcgttg tcgcaatcgt atcaaaactca ggccggcaaga 960  
gatactgtta gacagtagtt ctctaaccct ctgagtgcga ttgtgacacc gaaccaggg 1020  
tttcagaaaa caggataccg ggtgtatatt aattcagcag ttctaaaaac gttgtacgag 1080  
tctctcatga agtctcttga tactagaaat aggtcattg aaactgaaga agagtgcgt 1140  
ccatcggtt ccgaagtatc taatgcaaca caactgttg atgatgcgac cgtggccatc 1200  
aggagtcaaa tttagctttt gctgaacgag ctctccaaac gacatggtct gatgaacagg 1260  
gcagagttcg aggtttttat accttggggt actgpgccag ctacataggc gtgggtgcaca 1320  
cgatagtga cagtgttttt ctctccactt aaatcgaaga gatatactta cgggtgaatt 1380  
ccgcaagggt gggttaaaac aaattacgca atgttttagg ttccatttaa atcgaaacct 1440  
gttatttctt ggatcacctg ttaagctacg cgtggcgctat attacagtgg gaataactaa 1500  
aagtgagagg ttogaattct ccttaactcc gggtaggggc cca 1563

<210> 24  
 <211> 55  
 <212> DNA  
 <213> rape mosaic virus

<400> 24  
 gatggggcct taatacgact cactatagtt ttatTTTTgt tgcaacaaca acaac 55

<210> 25  
 <211> 30  
 <212> DNA  
 <213> rape mosaic virus

<400> 25  
 cttgtgccct tcatgacgag ctatatcacg 30

<210> 26  
 <211> 497  
 <212> DNA  
 <213> rape mosaic virus

<400> 26  
 ccttaataag acicactata gttttatTTT tgttgcaaca acaacaacaa attacaataa 60  
 caacaaaaca aatacaaaaca acaacaacat ggcacaattt caacaaaacag taaacatgca 120  
 aacattgcag gctgccgcag ggogcaacag cctgggtgaat gatttagcct cacgacgtgt 180  
 ttatgacaat gctgtcgagg agctaaatgc acgctcgaga cgccctaagg ttcattactc 240  
 caaatcagtg tctacggaac atgacgctgt tagcttcaaa cgcttatccg gagtttgaga 300  
 ttccctttac tcatacccaa catgccgtac actcccttgc ggggtggccta aggactcttg 360  
 agtttagagta tctcatgatg caagttccgt tgggttctct gacgtacgac atcgggtggt 420  
 actttgcagc gcaccttttc aaaggacgcg actacgttca ctgctgtatg ccaaacttgg 480  
 atgtacgtga tatagct 497

<210> 27  
 <211> 59  
 <212> DNA  
 <213> rape mosaic virus

<400> 27  
 gatggggcct taatacgact cactatagtt ttatTTTTgt tgcaacaaca acaac 55

<210> 28  
 <211> 37  
 <212> DNA  
 <213> rape mosaic virus

<400> 28  
 atcgttttaa ctggggccct acccggggtt agggagg 37

<210> 29  
 <211> 497  
 <212> DNA  
 <213> rape mosaic virus

<400> 29  
 ccttaataag acicactata gttttatTTT tgttgcaaca acaacaacaa attacaataa 60  
 caacaaaaca aatacaaaaca acaacaacat ggcacaattt caacaaaacag taaacatgca 120  
 aacattgcag gctgccgcag ggogcaacag cctgggtgaat gatttagcct cacgacgtgt 180

ttatgacaat gctgtcgagg agctaaatgc acgctcgaga cgccttaagg ttcattactc	240
caaatcagtg tctacggaac agacgctggt agcttcaaac gcttatccgg agtttgagat	300
tccctttact cctacccaaa catgcggtac actcccttgc ggggtggccta aggactcttg	360
agtttagagta tctcatgatg caagtctcgt tcgggtctct gacgtacgac atcgggtggta	420
actttgcagc gaccttttcc aaaggacgcg actacgttca ctgctgtatg ccaaacttgg	480
atgtacgtga tatagct	497

<210> 30  
 <211> 55  
 <212> DNA  
 <213> rape mosaic virus

<400> 30	
gatggcgctt taatacgact cactatagtt ttatttttgt tgcaacaaca acaac	55

<210> 31  
 <211> 37  
 <212> DNA  
 <213> rape mosaic virus

<400> 31	
atogtttaaa ctgggcccct acccgggggt agggagg	37

<210> 32  
 <211> 25  
 <212> DNA  
 <213> Pichia pastoris

<400> 32	
ctgacctctg ttggctcatg acgat	25

<210> 33  
 <211> 26  
 <212> DNA  
 <213> Pichia pastoris

<400> 33	
caagcttgca caaacgaacg tctcac	26

<210> 34  
 <211> 42  
 <212> DNA  
 <213> Pichia pastoris

<400> 34	
cactcgagag catggctatt cccgaagaat ttgatattat cg	42

<210> 35  
 <211> 36  
 <212> DNA  
 <213> Pichia pastoris

<400> 35	
tccctaggtt agaattctagc aagaccggtc ttctcg	36

<210> 36  
 <211> 14

400-36  
tcgagcgggc gcat 14

gactcgactg caccatgata agattcttag tctctctttt gc 42

tccttaggct aaatagcata acttccacat caaagc 36

4400: 39  
gttttaaata cgcctcagagg atg atc aga ttc tta gtc ctc tct ttg cta att 52  
Met Ile Arg Phe Leu Val Leu Ser Leu Leu Ile  
1 5 10

ctc acc ctc ttc cta aca act cct gct gtg gag ggc gat gtt agc ttc 100  
Leu Thr Leu Phe Leu Thr Thr Pro Ala Val Glu Gly Asp Val Ser Phe  
15 20 25

cgt tta tca  
 Arg Leu Ser  
 36

Met Ile Arg Phe Leu Val Leu Ser Leu Leu Ile Leu Thr Leu Phe Leu  
1 5 10 15  
Thr Thr Pro Ala Val Glu Gly Asp Val Ser Phe Arg Leu Ser  
20 25 30

8 16



<211> 19  
 <212> PRT  
 <213> P ycelii

<400> 41  
 Ser Tyr Val Pro Ser Ala Glu Gln Ile Leu Glu Phe Val Lys Gln Ile  
 1 5 10 15  
 Ser Ser Gln

<210> 42  
 <211> 839  
 <212> DNA  
 <213> Nicotiana benthamiana

<220>  
 <221> CDS  
 <222> (15)...(677)

<400> 42  
 attcaatttc ggcg atg gct cta cct aac cag caa acc gtg gat tac cct 50  
 Met Ala Leu Pro Asn Gln Gln Thr Val Asp Tyr Pro  
 1 5 10  
 agc ttc aag ctc gtt atc gtt ggc gat gga ggc aca ggg aag acc aca 98  
 Ser Phe Lys Leu Val Ile Val Gly Asp Gly Gly Thr Gly Lys Thr Thr  
 15 20 35  
 ttt gta aag aga cat ctt act gga gag ttt gag aag aag tat gaa ccc 146  
 Phe Val Lys Arg His Leu Thr Gly Glu Phe Glu Lys Lys Tyr Glu Pro  
 30 35 40  
 act att ggt gtt gag gtt cat cct ctt gat ttc ttc act aac tgt ggc 194  
 Thr Ile Gly Val Glu Val His Pro Leu Asp Phe Phe Thr Asn Cys Gly  
 45 50 55 60  
 aag atc cgt ttc tac tgt tgg gat act gct ggc caa gag aaa ttt ggt 242  
 Lys Ile Arg Phe Tyr Cys Trp Asp Thr Ala Gly Gln Glu Lys Phe Gly  
 65 70 75  
 ggt ctt agg gat ggt tac tac atc cat gga caa tgt ggt atc atc atg 290  
 Gly Leu Arg Asp Gly Tyr Tyr Ile His Gly Gln Cys Ala Ile Ile Met  
 80 85 90  
 ttt gat gtc aca gca cga ctg aca tac aag aat gtt cca aca tgg cat 338  
 Phe Asp Val Thr Ala Arg Leu Thr Tyr Lys Asn Val Pro Thr Trp His  
 95 100 105  
 cgt gat ctt tgc agg gtt tgt gaa aac atc cca att gtt ctt tgt ggg 386  
 Arg Asp Leu Cys Arg Val Cys Glu Asn Ile Pro Ile Val Leu Cys Gly  
 110 115 120  
 aat aaa gtt gat gtg aag aac agg caa gtc aag gcc aag cag gta aca 434  
 Asn Lys Val Asp Val Lys Asn Arg Gln Val Lys Ala Lys Gln Val Thr  
 125 130 135 140  
 ttc cac agg aag aag aac ctc cag tat tac gag ata tct gcc aag agc 482

Phe His Arg Lys Lys Asn Leu Gln Tyr Tyr Glu Ile Ser Ala Lys Ser	
145	155
aac tac aac ttc gag aag cca ttc ttg tac ctt gct aga aag ctc gct	530
Asn Tyr Asn Phe Glu Lys Pro Phe Leu Tyr Leu Ala Arg Lys Leu Ala	
160	170
ggg gac gct aat ctt cac ttt gtg gaa tca cct gcc ctt gct ccc ccg	578
Gly Asp Ala Asn Leu His Phe Val Glu Ser Pro Ala Leu Ala Pro Pro	
175	185
gaa gtt caa atc gac ttg gct gct cag cag cag cat gag ggg gag ctt	626
Glu Val Gln Ile Asp Leu Ala Ala Gln Gln Gln His Glu Ala Glu Leu	
190	200
gca gca gca gca agt cag cca ctt cct gat gac gat gat gac acc ttc	674
Ala Ala Ala Ala Ser Gln Pro Leu Pro Asp Asp Asp Asp Asp Thr Phe	
205	220
gag tagagaaaga gagatgtgat ctgtcactga ttaccgcta gggcttgtct	727
Glu	
gaactttttt ttgttcattg tgcatttttt atgtgtcpgt actttgaaat gaatcgatga	787
cattagtaat ttccattttt aagtttttaa ctgtcgctat gaaagtgaaa ac	839

<210> 43

<211> 221

<212> PRT

<213> Nicotiana benthamiana

<400> 43

Met Ala Leu Pro Asn Gln Gln Thr Val Asp Tyr Pro Ser Phe Lys Leu	
1	15
Val Ile Val Gly Asp Gly Gly Thr Gly Lys Thr Thr Phe Val Lys Arg	
20	30
His Leu Thr Gly Glu Phe Glu Lys Lys Tyr Glu Pro Thr Ile Gly Val	
35	45
Glu Val His Pro Leu Asp Phe Thr Asn Cys Gly Lys Ile Arg Phe	
50	60
Tyr Cys Trp Asp Thr Ala Gly Gln Glu Lys Phe Gly Gly Leu Arg Asp	
65	80
Gly Tyr Tyr Ile His Gly Gln Cys Ala Ile Ile Met Phe Asp Val Thr	
85	95
Ala Arg Leu Thr Tyr Lys Asn Val Pro Thr Trp His Arg Asp Leu Cys	
100	110
Arg Val Cys Glu Asn Ile Pro Ile Val Leu Cys Gly Asn Lys Val Asp	
115	125
Val Lys Asn Arg Gln Val Lys Ala Lys Gln Val Thr Phe His Arg Lys	
130	140
Lys Asn Leu Gln Tyr Tyr Glu Ile Ser Ala Lys Ser Asn Tyr Asn Phe	
145	160
Glu Lys Pro Phe Leu Tyr Leu Ala Arg Lys Leu Ala Gly Asp Ala Asn	
165	175
Leu His Phe Val Glu Ser Pro Ala Leu Ala Pro Pro Glu Val Gln Ile	
180	190
Asp Leu Ala Ala Gln Gln Gln His Glu Ala Glu Leu Ala Ala Ala	

195                      200                      205  
 Ser Gln Pro Leu Pro Asp Asp Asp Asp Asp Thr Phe Glu  
 210                      215                      220

<210> 44  
 <211> 738  
 <212> DNA  
 <213> *Nicotiana benthamiana*

<400> 44  
 cttaactttt ggcgatggct ctacctaacc agcaaacgct ggattacccct agcttcaagg 60  
 togttatcgt tggcgatgga ggcacaggga agaccacatt tgtaaagaga catcttactg 120  
 gagagtttga gaagaagtat gaaccacata ttgggtgtga ggttcacccct cttgattttct 180  
 tcaataactg tggcaagatc cgtttctact gttggatact gctgggcaag agaaatttgg 240  
 tgggttttag gatggttact acatccatgg acaatgtgct atcatcatgt ttgatgtcac 300  
 agcaagactg acatacaaga atgttccaac atggcacccg gatctttgca ggggtttctg 360  
 aaaacatccc aattgtttct tgtgggaata aagtgtatgt gaagaacagg caagtcaagg 420  
 ccaagcaggt aacattccac aggaagaaga acctccagta ttaagagata totgccaaga 480  
 gcaactacaa cttcgagaag ccattcttgt accttgctag aaagctcgcc ggggacgcta 540  
 atcttaactt tgtggaatca cctgccttgc ctcccctgga agttcaaatc gacttggctg 600  
 ctcaagagca gcatgaggcg gagcttgcag cagcagcaag tcagccactt cctgatgaag 660  
 atgatgacac cttcgagtag agaaagagag atgtgatctg tcactgatta ccggttaggg 720  
 cttgtctgaa cttctttt 738

<210> 45  
 <211> 679  
 <212> DNA  
 <213> *Arabidopsis thaliana*

<400> 45  
 cttaactttt ggcgatggct ctacctaacc agcaaacgct ggattacccct agcttcaagg 60  
 togttatcgt tggcgatgga ggcacaggga agaccacatt tgtaaagaga catcttactg 120  
 gagagtttga gaagaagtat gaaccacata ttgggtgtga ggttcacccct cttgattttct 180  
 tcaataactg tggcaagatc cgtttctact gttgggatac tgcctgggcaag gagaaatttg 240  
 gtgggttttag ggatggttac tacatccatg gacaatgtgc tatcatcatg ttgatgtcac 300  
 cagcagcact gacatacagg aatgttccaa catggcaccc tgatctttgc aggggttctg 360  
 ccaagcaggt aacattccac aggaaggagg aactccagta ttaagagata totgccaaga 420  
 gcaactacaa cttcgagaag ccattcttgt accttgctag aaagctcgcc ggggacgcta 480  
 atcttaactt tgtggaatca cctgccttgc ctcccctgga agttcaaatc gacttggctg 540  
 ctcaagagca gcatgaggcg gagcttgcag cagcagcaag tcagccactt cctgatgaag 600  
 atgatgacac cttcgagtag agaaagagag atgtgatctg tcactgatta ccggttaggg 660  
 cttgtctgaa cttctttt 679

<210> 46  
 <211> 667  
 <212> DNA  
 <213> *N. tabacum*

<400> 46  
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 gatggaggca cagggaagac cacatttcta aagagacatc ttaactggaga gtttgagaag 120  
 aagtatgaac ccactatttg ttttgaggtt caccctcttg attctctcac taactgtggc 180  
 aagatccgtt tctactgttg ggatactgct ggccaagaga aatttggctg tcttagggat 240  
 ggttaactaca tccatggaca atgtgctatc atcatgttgc atgtcacagc acgactgaca 300  
 tacaagaatg ttccaacatg gacccgtgat ctttgcaggg ttctgtgaaa catcccaatt 360  
 gttcttttct ggaataaagt tgatgtgaag aacaggcaag tcaaggccaa gcaggtaaca 420  
 ttccacagga agaagaacct ccagtattac gagatatctg ccaagagcaa ctacaacttc 480

gagaagccat	tcttgtacct	tgctagaaaag	ctcgccgggg	acgctaactct	tcactttgtg	540
gaatcacctg	cccttgctcc	cccggaagtt	caaatcgact	tgggtgctca	gcagcagcat	600
gaggcggagc	ttgcagcagc	agcaagtcag	ccacttcctg	atgaacgatga	tgacaccttc	660
gagtaga						667

<210> 47  
 <211> 667  
 <212> DNA  
 <213> N. tabacum

atggctctac	caaaccaaca	aactgtagat	tatccaagct	tcaagcttgt	aatcgtgggc	60
gatggaggaa	ctgggaaaac	aacttttgtc	aagaggcatic	tcactgggtga	atttgagaag	120
aaatatgaac	ccactattgg	tgtggaggtt	catccattag	acttcctcac	aaattgtggg	180
aaaattcgtc	tttattggtg	ggatactgct	ggacaagaga	agtttgaggg	tcttcgggat	240
ggttactaca	ttcatgggca	atgcgcaatt	atcatgtttg	atgttacagc	ccgtctgacc	300
tacaagaatg	ttcctacgtg	gcctcgagat	ctctgcaggg	tttgtgaaaa	catccctatt	360
gttctttgtg	gaaacaaagt	tgatgtcaag	aacaggcagg	tttaaggcaaa	gcaagttacc	420
ttccacagga	agaaaaattt	gcaatactat	gagatctcag	caaagagtaa	ctacaacttt	480
gagaagcctt	ttctgtacct	tgcagaaaag	cttgctgggg	atgctaactct	tcactttgtg	540
gaatcacctg	cacttgctcc	ccctgaagta	caaattgatt	tagctgcaca	gcaactgcat	600
gaacaagagc	ttttgcaagc	cgtctggcac	gcacttcacg	atgaacgatga	tgaagctttt	660
gaataga						667

<210> 48  
 <211> 137  
 <212> PFT  
 <213> Tobacco mosaic virus

<400> 48															
Met	Ala	Leu	Pro	Asn	Gln	Gln	Thr	Val	Asp	Tyr	Pro	Ser	Phe	Lys	Leu
1				5					10					15	
Val	Ile	Val	Gly	Asp	Gly	Gly	Thr	Gly	Lys	Thr	Thr	Phe	Val	Lys	Arg
		20						25					30		
His	Leu	Thr	Gly	Glu	Phe	Glu	Lys	Lys	Tyr	Glu	Pro	Thr	Ile	Gly	Val
		35					40					45			
Glu	Val	His	Pro	Leu	Asp	Phe	Phe	Thr	Asn	Cys	Gly	Lys	Ile	Arg	Phe
		50				55					60				
Tyr	Cys	Trp	Asp	Thr	Ala	Gly	Gln	Glu	Lys	Phe	Gly	Gly	Leu	Arg	Asp
65					70					75				80	
Gly	Tyr	Tyr	Ile	His	Gly	Gln	Cys	Ala	Ile	Ile	Met	Phe	Asp	Val	Thr
			35					90						95	
Ala	Arg	Leu	Thr	Tyr	Lys	Asn	Val	Pro	Thr	Trp	His	Arg	Asp	Leu	Cys
		100						105					110		
Arg	Val	Cys	Glu	Asn	Ile	Pro	Ile	Val	Leu	Cys	Gly	Asn	Lys	Val	Asp
		115					120					125			
Val	Lys	Asn	Arg	Gln	Val	Lys	Ala	Lys							
		130					135								

<210> 49  
 <211> 135  
 <212> PFT  
 <213> Tobacco Mosaic Virus

<400> 49															
Met	Ala	Leu	Pro	Asn	Gln	Gln	Thr	Val	Asp	Tyr	Pro	Ser	Phe	Lys	Leu
1				5					10					15	

Val	Ile	Val	Gly	Asp	Gly	Gly	Thr	Gly	Lys	Thr	Thr	Phe	Val	Lys	Arg
		20						25					30		
His	Leu	Thr	Gly	Glu	Phe	Glu	Lys	Lys	Tyr	Glu	Pro	Thr	Ile	Gly	Val
		35					40					45			
Glu	Val	His	Pro	Leu	Asp	Phe	Phe	Thr	Asn	Cys	Gly	Lys	Ile	Arg	Phe
	50					55					60				
Tyr	Cys	Trp	Asp	Thr	Ala	Gly	Gln	Glu	Lys	Phe	Gly	Gly	Leu	Arg	Asp
65					70					75				80	
Gly	Tyr	Tyr	Ile	His	Gly	Gln	Cys	Ala	Ile	Ile	Met	Phe	Asp	Val	Thr
			85						90					95	
Ser	Thr	Thr	Asp	Ile	Gln	Glu	Cys	Ser	Asn	Met	Ala	Pro	Ser	Leu	Gln
			100					105					110		
Gly	Leu	Lys	His	Ser	Gln	Leu	Phe	Val	Gly	Ile	Lys	Leu	Met	Lys	
		115					120					125			
Asn	Arg	Gln	Val	Lys	Ala	Gln									
	130					135									

<210> 50  
 <211> 277  
 <212> DNA  
 <213> Tobacco mosaic virus

<220>  
 <221> CDS  
 <222> (1)...(277)

<400> 50																
gct	act	atg	gtt	gcc	tct	cgg	gct	cag	gcc	act	atg	gtc	gct	cct	ttc	48
Ala	Thr	Met	Val	Ala	Ser	Pro	Ala	Gln	Ala	Thr	Met	Val	Ala	Pro	Phe	
1			5					10					15			
aac gga ctt aag tcc tcc gct cct tcc cag cca ccc gca agg cta aca															96	
Asn	Gly	Leu	Lys	Ser	Ser	Ala	Pro	Ser	Gln	Pro	Pro	Ala	Arg	Leu	Thr	
			20					25				30				
acg aca tta ctt cca tca caa gca acg gcg gaa gag tta act gca tgc															144	
Thr	Thr	Leu	Leu	Pro	Ser	Gln	Ala	Thr	Ala	Glu	Glu	Leu	Thr	Ala	Cys	
			35				40					45				
agg tgt ggc ctc cga ttg gaa aga aga agt ttg aga ctc tct ctt acc															192	
Arg	Cys	Gly	Leu	Arg	Leu	Glu	Arg	Arg	Ser	Leu	Arg	Leu	Ser	Leu	Thr	
		50				55					60					
ttc ctg acc tta cgg att cgg aat tgg cta agg aag ttg act acc tta															240	
Phe	Leu	Thr	Leu	Pro	Ile	Pro	Asn	Trp	Leu	Arg	Lys	Leu	Thr	Thr	Leu	
		65			70					75				80		
tcc gca aca agt gga ttc ctt gtg ttg aat tcg aag t															277	
Ser	Ala	Thr	Ser	Gly	Phe	Leu	Val	Leu	Asn	Ser	Lys					
				85					90							

<210> 51  
 <211> 92  
 <212> PRT  
 <213> Tobacco mosaic virus

<400> 51  
 Ala Thr Met Val Ala Ser Pro Ala Gln Ala Thr Met Val Ala Pro Phe  
 1 5 10 15  
 Asn Gly Leu Lys Ser Ser Ala Pro Ser Gln Pro Pro Ala Arg Leu Thr  
 20 25 30  
 Thr Thr Leu Leu Pro Ser Gln Ala Thr Ala Glu Glu Leu Thr Ala Cys  
 35 40 45  
 Arg Cys Gly Leu Arg Leu Glu Arg Arg Ser Leu Arg Leu Ser Leu Thr  
 50 55 60  
 Phe Leu Thr Leu Pro Ile Pro Asn Trp Leu Arg Lys Leu Thr Thr Leu  
 65 70 75 80  
 Ser Ala Thr Ser Gly Phe Leu Val Leu Asn Ser Lys  
 85 90

<210> 51  
 <211> 167  
 <212> DNA  
 <213> Arabidopsis thaliana

<400> 52  
 acttgatctg ttccatacta aaaccaaaac tcatgtttgt tcaactccaaa caccaaacaca 60  
 gcagtaatca aaaatcgtct tataacaaaa ggaaatgcaa caaaacagaa gaaacaacta 120  
 agtagtaggc aagattcttc ttcactcgtc ttcttggtta cggagcc 167

<210> 51  
 <211> 393  
 <212> DNA  
 <213> Arabidopsis thaliana

<400> 53  
 gaaaagagct cggctagtta ttgggcatgg cctgaccagc agcaacaaca tcacaatcat 60  
 catcagttca attgatcata ttgtctaaga acaacatcat actcatcttg atatcattat 120  
 ttatcatcaa aagaaaattc cgtagatttt tttataaagt attttcaa attttggcac 180  
 gtttaaaatt aattaaattg gggtattatg tttacttgat ctgtttcata ctaaaaccaa 240  
 aaggaaaaac aaaactcatg ttgttcact ccaaacacaa acacagpagt aatcaaaaat 300  
 cgtcttataa caaaaaggaa atgcaacaaa acagaagaaa caactaagta gtaggcaaga 360  
 ctctctctca ctgtctcttc tggctacgga gcc 393

<210> 54  
 <211> 24  
 <212> PRT  
 <213> Arabidopsis thaliana

<400> 54  
 Glu Thr Thr Ser Ala Ser Tyr Trp Ala Trp Pro Asp Gln Gln Gln Gln  
 1 5 10 15  
 His His Asn His His Gln Phe Asn  
 20

<210> 55  
 <211> 418  
 <212> DNA  
 <213> Homo sapiens

<400> 55  
 gaagcggctc ggcgcacag tgatgaagtg cgggaagggc aaagtctggc tccatcccaa 60  
 cgaaagctcc gacatctcca tggccaattc ccgccaaaac atcaggaagc ttgtgaagga 120

tggtttcatt	atcaggaagg	caaccaagat	tcaactctgt	tccagagctc	gcaaaatgaa	180
gattgccaag	atgaagggtc	gtcactctgg	atacggtaag	aggaagggtc	cccgtagagg	240
taggttgcca	acaaagggtc	tgtggatgag	taggatgctg	gttcttaggc	gtctgttgaa	300
gaaatacaga	gagacgaaga	agattgacaa	gcacatgtac	catgacatgt	acatgctgtg	360
taagggtaat	gtgttcaaga	acaagcgtgt	cttgatggag	agtatccaca	agtc aaaggc	420
ctagaagcta	ggggagaa					438

<210> 56  
 <211> 438  
 <212> DNA  
 <213> Homo sapiens

gaagaggctc	gcctctagtg	tcctccgctg	tggaagaag	aaggctctgt	tagaccccaa	60
tgagaccaat	gaaatcgcca	atgccaactc	ccgtcaggag	atccggaagg	tcataaaaga	120
tggtctgatt	atccgcaagg	ctgtgacggg	ccattccggg	gtctgatgac	ggaaaaaacac	180
cttggccggc	cggaagggtc	ggcacatggg	cataggtaag	cggaagggtc	cagccaatgc	240
ccgaatgcca	gagaagggtc	catggatgag	gagaatgagg	atcttgcggc	ggctgctcag	300
aagataccgt	gaatctaaga	agatcgatcg	ccacatgtat	cacagcctgt	acctgaagggt	360
gaaggggaat	gtgttcaaaa	acaagcggat	tctcatggaa	cacatccaca	agctgaaggc	420
agacaaggcc	cgcaagaa					438

<210> 57  
 <211> 438  
 <212> DNA  
 <213> Homo sapiens

gaagcggctc	gcgcgcatcag	tgatgaagtg	cggaagggtc	aaagtctgtg	togatcccaa	60
cgaaagctcc	gacatctcca	tgccaatttc	ccgccaaaac	atcaggaagg	ttgtgaaggc	120
tggtttcatt	atcaggaagg	caaccaagat	tcaactctgt	tccagagctc	gcaaaatgaa	180
gattgccaag	atgaagggtc	gtcactctgg	atacggtaag	aggaagggtc	cccgtagagg	240
taggttgcca	acaaagggtc	tgtggatgag	taggatgctg	gttcttaggc	gtctgttgaa	300
gaaatacaga	gagacgaaga	agattgacaa	gcacatgtac	catgacatgt	acatgctgtg	360
taagggtaat	gtgttcaaga	acaagcgtgt	cttgatggag	agtatccaca	agtc aaaggc	420
ctagaagcta	ggggagaa					438

<210> 58  
 <211> 438  
 <212> DNA  
 <213> Homo sapiens

gaagaggctc	gcctctagtg	tcctccgctg	tggaagaag	aaggctctgt	tagaccccaa	60
tgagaccaat	gaaatcgcca	atgccaactc	ccgtcaggag	atccggaagg	tcataaaaga	120
tggtctgatt	atccgcaagg	ctgtgacggg	ccattccggg	gtctgatgac	ggaaaaaacac	180
cttggccggc	cggaagggtc	ggcacatggg	cataggtaag	cggaagggtc	cagccaatgc	240
ccgaatgcca	gagaagggtc	catggatgag	gagaatgagg	atcttgcggc	ggctgctcag	300
aagataccgt	gaatctaaga	agatcgatcg	ccacatgtat	cacagcctgt	acctgaagggt	360
gaaggggaat	gtgttcaaaa	acaagcggat	tctcatggaa	cacatccaca	agctgaaggc	420
agacaaggcc	cgcaagaa					438

<210> 59  
 <211> 145  
 <212> PRT  
 <213> Tobacco mosaic virus

<400> 59

Lys	Arg	Leu	Ala	Ala	Ser	Val	Met	Lys	Cys	Gly	Lys	Gly	Lys	Val	Trp
1			5					10						15	
Leu	Asp	Pro	Asn	Glu	Ser	Ser	Asp	Ile	Ser	Met	Ala	Asn	Ser	Arg	Gln
			20					25						30	
Asn	Ile	Arg	Lys	Leu	Val	Lys	Asp	Gly	Phe	Ile	Ile	Arg	Lys	Pro	Thr
			35				40						45		
Lys	Ile	His	Ser	Arg	Ser	Arg	Ala	Arg	Lys	Met	Lys	Ile	Ala	Lys	Met
			50			55					60				
Lys	Gly	Arg	His	Ser	Gly	Tyr	Gly	Lys	Arg	Lys	Gly	Thr	Arg	Glu	Ala
65					70					75					80
Arg	Leu	Pro	Thr	Lys	Val	Leu	Trp	Met	Arg	Arg	Met	Arg	Val	Leu	Arg
				85					90					95	
Arg	Leu	Leu	Lys	Lys	Tyr	Arg	Glu	Thr	Lys	Lys	Ile	Asp	Lys	His	Met
			100					105					110		
Tyr	His	Asp	Met	Tyr	Met	Arg	Val	Lys	Gly	Asn	Val	Phe	Lys	Asn	Lys
		115					120					125			
Arg	Val	Leu	Met	Glu	Ser	Ile	His	Lys	Ser	Lys	Ala	Lys	Leu	Gly	Glu
		130					135					140			

Lys  
145

<210> 60  
 <211> 147  
 <212> PRT  
 <213> Homo sapiens

<400> 60

Lys	Arg	Leu	Ala	Ser	Ser	Val	Leu	Arg	Cys	Gly	Lys	Lys	Lys	Val	Trp
1			5					10						15	
Leu	Asp	Pro	Asn	Glu	Thr	Asn	Glu	Ile	Ala	Ala	Asn	Ala	Asn	Ser	Arg
			20					25						30	
Gln	Gln	Ile	Arg	Lys	Leu	Ile	Lys	Asp	Gly	Leu	Ile	Ile	Arg	Lys	Pro
			35				40						45		
Val	Thr	Val	His	Ser	Arg	Ala	Arg	Cys	Arg	Lys	Asn	Thr	Leu	Ala	Arg
		50				55					60				
Arg	Lys	Gly	Arg	His	Met	Gly	Ile	Gly	Lys	Arg	Lys	Gly	Thr	Ala	Asn
65					70					75					80
Ala	Arg	Met	Pro	Glu	Lys	Val	Thr	Trp	Met	Arg	Arg	Met	Arg	Ile	Leu
				85					90					95	
Arg	Arg	Leu	Leu	Arg	Arg	Tyr	Arg	Glu	Ser	Lys	Lys	Ile	Asp	Arg	His
			100					105					110		
Met	Tyr	His	Ser	Leu	Tyr	Leu	Lys	Val	Lys	Gly	Asn	Val	Phe	Lys	Asn
		115					120					125			
Lys	Arg	Ile	Leu	Met	Glu	His	Ile	His	Lys	Leu	Lys	Ala	Asp	Lys	Ala
		130					135					140			

Arg Lys Lys  
145